REMARKS

The Applicants thank the Examiner for the thorough examination of the application. No new matter is believed to be added to the application by this Amendment.

Status of the Claims

Claims 1-26 are pending in the application. Claims 7, 8 and 19-22 are allowed. Support for claims 23-26 can be found in paragraph 0058 at page 15, lines 1-6 of the specification.

Rejections Based Upon Henley '754

Claims 1, 3, 9, 10, 13 and 14 are rejected under 35 U.S.C. §102(b) as being anticipated by Henley '754 (U.S. Patent No. 5,073,754). Claims 2, 11 and 12 are rejected under 35 U.S.C. §103(a) as being obvious over Henley '754 in view of Henley '150 (U.S. Patent No. 5,285,150). Claims 5, 15 and 16 are rejected under 35 U.S.C. §103(a) as being obvious over Henley '754 in view of Field '653 (U.S. Patent No. 6,323,653). Claims 6, 17 and 18 are rejected under 35 U.S.C. §103(a) as being obvious over Henley '754 in view of Field '653 (as applied to claims 5 and 15) and further in view of Henley '150. The applicants respectfully note that claim 4 has not been included in the aforesaid rejections. Applicants traverse.

The Present Invention And Its Advantages

The present invention pertains to an inspection method and apparatus for a flat display device where a magnetic sensor scans signal wires along a scan direction crossing the signal wires. The invention measures current induced in a magnetic sensor. As a result, the invention rapidly and exactly accomplishes the finding of defects such as a short circuit or an open circuit in a signal wire.

The invention finds a typical embodiment in claim 1:

> 1. An inspection method for a flat display device, comprising:
> scanning signal wires by using a magnetic sensor along a scan direction crossing a plurality of the signal wires; and
> detecting at least one of a short or an open circuit in the signal wires based on a current of the signal wires detected by the magnetic sensor.

Independent claims 5, 9 and 15 recite similar features.

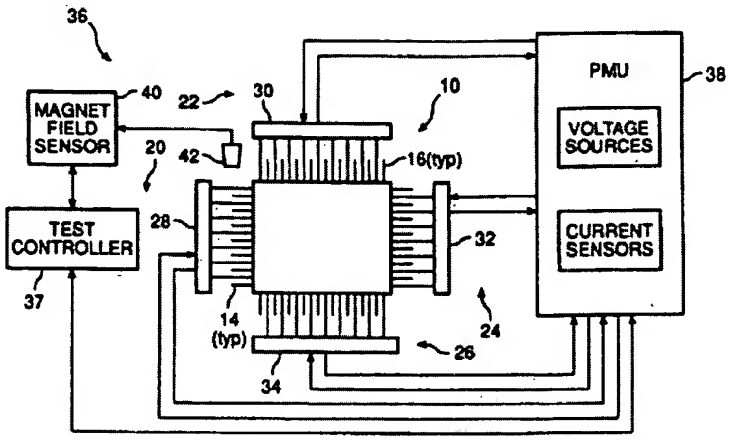
One of the many novel aspects to the invention resides in that the magnetic sensor scans over the signal wires, as is readily observable in Figures 4-6, 8-15, 17 and 18. This direct scanning capability is explained in paragraph 0058 at page 15, lines 1-6 of the specification:

> [0058] In order to improve the precision of the inspection, the gap 1 of the inductive sensor is preferably set below the width of the signal wire 5 that will be inspected. For example, the gap 1 may be set within several μm to several tens of μm. The gap, however, is not restricted to this range and can be set, for example, to a sub-micron value or to a value in excess of about 100 μm.

Typically, claim 23 recites: "The inspection method according to claim 1, wherein the magnetic sensor has a gap that is less than a width of the signal wires." *See also* claims 24-26.

Distinctions of the Invention over the Cited Art

Henley '754 pertains to a method and apparatus for testing an LCD panel ray by using a magnetic field sensor at the periphery of the panel. This technology is typified in Figure 2 of Henley '754 which is reproduced below.



In Henley '754, a controller 37 signals a magnetic sensor 40 to scan drive lines and gate lines. Attached to the magnetic sensor 40 is a magnetic field pick-up device 42 which scans the lines. See Henley '754 at column 3, line 59 to column 4, line 6. This technology of Henley '754 is directed at determining magnetic field strengths to evaluate short circuit defects that are of different severity. See Henley '754 at column 4, lines 51-65.

An important limitation of the technology of Henley '754 arises from the peripheral nature of the scan. Henley '754 at column 3, lines 63-67 states: "While the shorting bar is exposed to such current signal, the controller 37 signals the magnetic sensor 40 to scan the drive lines 14 and gate lines 16 ***at each edge*** 20,

22, 24, 26 ***of the panel*** 10 to which each involved shorting bar is attached." (Emphasis added).

Henley '754 fails to disclose scanning over the signal lines.

The peripheral scanning technology of Henley '754 arises from the geometry of the line termination at the periphery of the panel, as is discusses at column 2, lines 28-32: "Because the gate lines and drive lines terminating at the periphery of the panel are spaced approximately 3 to 5 mils (75 to 376 microns) apart, a sensitive magnetic pick-up is able to isolate the line(s) involved."

In contrast, the invention uses a magnetic sensor that has a gap that can be at a sub-micron level, as is discussed in paragraph 0058 of the specification. At these geometries, the scanning is performed over the signal lines, and claim 1 of the invention typically recites "using a magnetic sensor along a scan direction ***crossing*** a plurality of the signal wires." (Emphasis added). This technology is suited to the high density LCDs of today, and the peripheral scanning of the low density technology of Henley '754 (which was filed in 1990) is inapplicable.

As a result, Henley '754 fails to anticipate each and every limitation of independent claim 1 and 9. Henley '754 additionally fails to be applicable as the basis of a *prima facie* case of obviousness.

At page 3 of the Office Action, the Examiner admits that Henley '754 fails to disclose a first or second power supply and turns to Henley '150 to supply this teaching. Henley '150 pertains to electro-optic assisted hierarchal zone inspection of LCDs, and Henley '150 fails to disclose defect sensing by passing a magnetic

sensor over signal lines. Henley '150 thus fails to address the deficiencies of Henley '754in suggesting a claimed embodiment of the invention. A *prima facie* case of obviousness has thus not been made over Henley '754 and Henley '150.

At page 5 of the Office Action, the Examiner admits that Henley '754 fails to disclose stacking of signal wires and an insulation layer. The Examiner further admits that Henley '754 fails to disclose a detection circuit that detects an interlayer short in the signal wires based on the current of the signal wires detected by the magnetic sensor. The Examiner then turns to Field '653.

Field '653 pertains to the magnetic detection of short circuits in a plate structure by using a current sensor 16 formed from a core 22 and a coil 24 of electrical wire wound a number of times around the core 22. See Field '653 at column 4, lines 54-66. That is, Field '653 pertains to a "current sensor" that senses current in ***amperes*** as opposed to the "magnetic field pick-up device" of Henley '754, and magnetic fields are measured in ***Gauss***.

As a result, one having ordinary skill in the art would have no motivation to turn to the teachings of Field '653, which pertains to current measurement, from studying the magnetic field measuring technology of Henley '754. Further, Field '653 fails to address the failures of the peripheral scanning technology of Henley '754 to disclose or suggest a claimed embodiment of the invention.

As a result, one having ordinary skill in the art would have no motivation to turn to the teachings of Field '653, which pertains to current measurement, from studying the magnetic field measuring technology of Henley '754. A *prima facie* case of obviousness has therefore not been made over Henley '754 and Field '653.

The Examiner then turns to Henley '150 for teachings pertaining to the utilization of two power supplies. However, the two power supplies of Henley '150 fail to address the non-combinability of Henley '754 and Field '653. As a result, a *prima facie* case of obviousness has not been made over Henley '754, Field '653, and Henley '150.

Therefore, independent claims 1, 5, 9 and 15 are patentable over the cited art. Claims depending upon these independent claims are patentable for at least the above reasons. These rejections are overcome and withdrawal thereof is respectfully requested.

Allowable Subject Matter

The Examiner has allowed claims 7, 8 and 19-22.

Prior Art

The prior art cited but not utilized by the Examiner indicates the status of the conventional art that the invention supercedes. Additional remarks are accordingly not necessary.

Foreign Priority

The Examiner has acknowledged foreign priority in the Office Actions mailed August 11, 2004 and January 25, 2005.

The Drawings

The Examiner is respectfully requested to indicate whether the drawing figures are acceptable in the next official action.

Conclusion

All of the Examiner's rejections and objections have been successfully traversed or obviated. No issues remain. The Examiner is accordingly respectfully requested to allow the application.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Robert E. Goozner, Ph.D. (Reg. No. 42,593) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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